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ORIGINAL ARTICLE

Comparison of the Outcome of Laparoscopic Vs Open Appendectomy in Tertiary Care Hospital of Muzaffarabad

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ABSTRACT

Aim: To determine the outcome of laparoscopic appendectomy in comparison to open appendectomy in patients admitted with acute appendicitis.
Study design: Randomized controlled trial.
Place and duration of study: Department of General Surgery, H.H SKBZ Hospital/ AK CMH Muzaffarabad from 23rd November 2019 to 22nd May 2020.
Methodology: A total of 70 patients of age 15-60 years of either gender presenting with appendicitis were included. Patients with co-morbidities i.e. hypertension (BP≥140/90mmhg), diabetes (BSR>180mg/dl), liver (ALT>40IU, AST>40IU), anemia (Hb<10g/L) were excluded. In group A, open appendectomy was done. In group B, laparoscopic appendectomy was done. All surgeries were done under general anesthesia by a single surgical team with assistance of researcher. Duration of surgery was noted in minutes. After appendectomy, patients were detained in surgical ward and were observed there till discharge.
Results: Mean operative time in Group A (open appendectomy) was 43.06±5.71 minutes while in Group B (laparoscopic appendectomy) was 50.71±3.67 minutes (p0.0001). Mean hospital stay in Group A (open appendectomy) was 4.0±0.73 days while in Group B (laparoscopic appendectomy) was 2.09±0.70 days (p0.0001). Wound infection in Group A (open appendectomy) was 8.57% while in Group B (laparoscopic appendectomy) was 2.86% (p0.303).
Conclusion: This study concluded that outcome of laparoscopic appendectomy is better as compared to open appendectomy in patients presenting with appendicitis.
Keywords: Appendicitis, Laparoscopic appendectomy, Hospital stay.

INTRODUCTION

In emergency departments of surgery, all over the world, acute appendicitis is a very common presenting problem. According to gender 8.6% males and 6.7% females have life time risk of getting acute appendicitis[1]. These patients present with a typical history which specifies acute appendicitis and then the diagnosis is further confirmed by clinical examination and laboratory as well as radiological investigations of the patients. Although the symptoms of acute appendicitis are always not very specific and in many cases they are so confusing that make the diagnosis somewhat difficult leading to delayed treatment and hence acute appendicitis is further complicated by complications like perforation, abscess or mass formation. On the other hand wrong diagnosis can lead to wrong exploration[2]. The appendectomy being the most common general surgical procedure being performed but still pose a diagnostic dilemma for surgeons. Although laboratory and imaging investigations have improved in diagnostic accuracy of the disease, clinical assessment is the mainstay of diagnosis. Failure to properly diagnose acute appendicitis in early stages can contribute to increased rates of mortality and morbidity[3].

First laparoscopic appendectomy was done by a German Gynecologist, Kurt Semm in 1980 who was a pioneer in minimal invasive surgery. From there a new debate was started by McBurney and Sprengel about the benefits of laparoscopic appendectomy in comparison to the open appendectomy. Laparoscopic appendectomy is not considered as a gold standard approach worldwide like laparoscopic cholecystectomy because of the increasing incidence of development of post op abdominal abscesses & longer time of procedure.[4]Laparoscopic appendectomy has gained in popularity in recent years specially while considering as an option for obese & elderly patients; however, the utility and benefits of laparoscopic appendectomy versus open surgery are yet not established in general population[5].

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According to a study the mean operative time in laparoscopic appendectomy was longer than traditional open appendectomy; the mean operative time with laparoscopic appendectomy was 54.9±14.7min and it was 31.36±11.43min with conventional appendectomy (p<0.01), the study also suggested that the mean hospital stay was shorter in laparoscopic appendectomy i.e. the mean hospital stay with laparoscopic appendectomy was 1.4±0.6days and 2.7±2.5days with open appendectomy (p=0.015) and wound infection was 13.8% with laparoscopy and 43.4% with open appendectomy (p<0.001).[6]But another study found that mean operative time with laparoscopic appendectomy was 33±6min and 37±7.5min with open appendectomy (p=0.79), mean hospital stay with laparoscopic appendectomy was 3.2days with laparoscopy and 4.4days with open appendectomy (p=0.47)[7].

The purpose of this study was to determine the outcome of laparoscopic appendectomy in comparison to open appendectomy in patients presenting with appendicitis. Laparoscopic appendectomy is not taken as gold standard approach worldwide but literature has shown that laparoscopy is better. But it is expensive, usually not available & usually not done in public sector hospitals. Worldwide controversial results have been noticed regarding the merits of laparoscopic over open appendectomy. Moreover, there are no guidelines available worldwide & neither are any local studies found in literature which could guide us in selecting laparoscopic appendectomy over open appendectomy. So to confirm the evidence, we want to conduct this study.

MATERIALS AND METHODS

After taking approval from ethical committee of hospital, seventy patients were selected from emergency department and surgical wards of H.H SKBZ Hospital/AK CMH Muzaffarabad. All patients were fulfilling the inclusion criteria.70 patients fulfilling the inclusion criteria were enrolled in the study from the emergency & surgical wards. Informed consent was obtained. Demographic information (name, gender, age and duration of appendicitis, Alvarado score) was taken over and recorded. Then all selected patients were

divided in two groups, randomly by using lottery method. In group A, open appendectomy was done. In group B, laparoscopic appendectomy was done. All surgeries were done under general anesthesia by a single surgical team with assistance of researcher. Duration of surgery was noted in minutes. After appendectomy, patients were detained in surgical wards and were observed there till discharge. Time duration of hospital stay was noted. At time of discharge, wound condition at surgical site was assessed and patients were discharged. Patients were followed-up in OPD after 10 days for removal of stitches and assessment of the wound. Data was analyzed and entered through SPSS version 20. Standard deviation &mean were calculated for the quantitative variables like duration of appendicitis, age, operative time, Alvarado score, and hospital stay. Percentage and frequency were calculated for the qualitative variables like wound infection and gender. Both groups were compared by using independent sample t-test for mean operative time and hospital stay & by using chi-square test for wound infection. P<0.05 was considered as significant. Data was stratified for gender, duration of appendicitis, age and Alvarado scores. Post-stratification, both groups were compared by using respective tests of significance with P≤ 0.05 taking as significant.

RESULTS

In this study the patients were included between the age of 15 years to the 60 years and mean age of our patients was 35.67±9.78 years. Out of total 70 patients, which were randomly divided in two groups, 47 were males patients (67.14%) and 23 were females patients (32.86%) with male to female ratio of 2.16:1.

Table 1: Stratification of operating time with respect to age, gender, duration of symptoms and Alvardoscore(n=70)

Co-morbid conditions	Group A Mean±SD	Group B Mean±SD	P value
Age in years			
15-40	43.75±5.99	51.0±3.26	0.0001
41-60	41.55±4.95	50.41±4.17	0.0001
Gender			
Male	43.83±5.88	51.22±3.57	0.0001
Female	41.36±5.16	49.75±3.84	0.0001
Duration (hours)			
≤6	40.50±4.41	53.0±3.25	0.0001
>6	43.81±5.90	50.04±3.57	0.0001
Alvarado score			
6-7	43.65±5.39	49.92±3.53	0.0001
>7	41.33±6.58	52.70±3.40	0.0001

Table 2: Stratification of hospital stay with respect to age, gender, duration of symptoms and Alvardo score.

Co-morbid conditions	Group A Mean±SD	Group B Mean±SD	P value
Age in years			
15-40	4.00±0.78	1.94±0.64	0.0001
41-60	4.00±0.63	2.24±0.75	0.0001
Gender			
Male	4.13±0.68	2.0±0.67	0.0001
Female	3.73±0.79	2.25±0.75	0.0001
Duration (hours)			
≤6	3.88±0.64	1.75±0.89	0.0001
>6	4.04±0.76	2.19±0.62	0.0001
Alvarado score			
6-7	4.12±0.71	2.28±0.68	0.0001
>7	3.67±0.71	1.60±0.52	0.0001

Mean duration of symptoms was 8.26±2.28 hours. Mean Alvardo score was 7.09±0.74.Mean operative time in Group A (open appendectomy) was 43.06±5.71 minutes while in Group B (laparoscopic appendectomy) was 50.71±3.67 minutes (p0.0001).Mean hospital stay in Group A (open appendectomy) was 4.0±0.73 days while in Group B (laparoscopic appendectomy) was 2.09±0.70 days (p0.0001). Wound infection in Group A (open appendectomy) was 8.57% while in Group B (laparoscopic appendectomy) was 2.86% (p0.303).Stratification of operating time with respect to age, gender, duration of symptoms and Alvardo score (Table 1).

Stratification of hospital stay with respect to age, gender, duration of symptoms and Alvardo score (Table 2). Stratification of wound infection with respect to age, gender, duration of symptoms and Alvardo score (Table 3).

Table 3: Stratification of wound infection with respect to age, gender, duration of symptoms and Alvardo score

Co-morbid conditions	Group A		Group B		P value
	Yes	No	Yes	No	
Age in years					
15-40	01	23	01	17	0.834
41-60	02	09	00	17	0.068
Gender					
Male	02	22	00	23	0.157
Female	01	10	01	11	0.949
Duration (hours)					
≤6	00	08	00	08	----
>6	03	24	01	26	0.299
Alvarado score					
6-7	02	24	00	25	0.157
>7	01	08	01	09	0.937

DISCUSSION

Among all the surgical emergencies, appendicitis is one of the most common presentation of acute abdomen. Considering the whole population, about 7% to 10% of the general population presents with acute appendicitis and most of these patients are in second or third decade of their life. First open appendectomy was performed McBurney in 1894 and it was considered as a gold standard procedure for the treatment of acute appendicitis. Later on first laparoscopic appendectomy was performed by a germen gynaecologist, Semm in 1983[8].

Although laparoscopic cholecystectomy and laparoscopic appendectomy are being performed side by side but appendectomy by laparoscopy has not gained much popularity in comparison to cholecystectomy. Multiple studies were conducted to compare the benefits of laparoscopic appendectomy to conventional appendectomy but still the advantages of laparoscopic procedure are not well establish in comparison to open procedure. Laparoscopic appendectomy is considered to give advantages as less requirement of postoperative analgesia, less duration of hospital stay, early postoperative recovery and finally good cosmetic results. In developing countries, laparoscopic appendectomies are not being conducted commonly so there are only few studies which compare the benefits of these two surgical procedures of appendectomy[9].

I have conducted this study in a developing city to determine the benefits of laparoscopic appendectomy in comparison to open appendectomy in patients presenting with appendicitis in our setup, where we are commonly performing open appendectomies. In this study, group A was operated by open procedure whereas group B was operated by laparoscopic procedure. In Group A mean operative time was 43.06±5.71 minutes while in Group B it was 50.71±3.67 minutes (p0.0001). Mean duration of hospital stay in Group A was 4.0±0.73 days while in Group B it was 2.09±0.70 days (p 0.0001). In Group A, Wound infection was 8.57% while in Group B it was 2.86% (p0.303).

A study performed by Biondi et al, it was seen that the mean duration of operative procedure in laparoscopic appendectomy was more prolonged than open appendectomy. With laparoscopic procedure it was 54.9±14.7min and with open appendectomy, it was 31.36±11.43min (p<0.01), this study also showed that the mean duration of hospital stay in laparoscopic appendectomy was shorter than the open appendectomy i.e. with laparoscopy, the mean hospital stay was 1.4±0.6days andwith open appendectomy it was 2.7±2.5 days (p=0.015) and wound infection was also less in laparoscopic procedure, it was 13.8% with laparoscopy and 43.4% with open appendectomy (p<0.001).[6]

In a study, conducted by Jawad, multiple criterias were assessed for the comparison of two procedures. Patients were divided in two groups A and B. ion group A the mean age of patients was 23.09±8.51 and in group B it was 23.12±10.42 years (P = 0.981). The mean hospital stay was also compared and in group A it was 1.52±0.76 and in group B 1.70±1.06 days (P = 0.294). The mean duration of operative procedure in group A and B were 47.54±12.82 min and 31.36±11.43 min, respectively (P <0.001). Postoperative pain was also considered but no specific scale was used, it was significantly less in group A in comparison to group B (P = 0.004). Other postoperative complications were also compared like paralytic ileus (P=0.086), hematoma (P=0.87), wound infection (P= 0.134) and urinary retention (P=0.504)[10]. After the start of laparoscopic appendectomies, early studies which were performed in 1990s to compare the benefits of two procedures, significantly showed that laparoscopic procedure is better than open because of short postoperative duration of stay in hospital and hence early discharge of the patient from the hospital. But letter on a controversy developed that whether it was type of procedure which resulted in better postoperative outcome or it was due to a better health care system in the hospitals where laparoscopic procedures are being performed[11].

In another study conducted by Bothara et al, it was observed that although laparoscopic procedure is better than the open procedure in terms of postoperative pain control (11.5 ± 3.1days needed to go back to normal daily activities in laparoscopic appendectomies and 16.1 ± 3.3 in open appendectomies), wound infections (1.4% vs 10.6%, P <0.001) and shorter duration of hospital stay (2.7 ± 2.5days in laparoscopic appendectomies and 1.4 ± 0.6days in open appendectomies) but duration of operative procedure was significantly less in open technique (31.36 ± 11.13min in open appendectomies and 54.9 ±14.2 in laparoscopic appendectomies) and open procedure was cost effective in comparison to the laparoscopic appendectomy[12].

A meta-analysis was done by Dai L in which thirty-three randomized controlled trials were included and total of 3642 patients were there in these trials (1810 laparoscopic appendectomy, 1832 open appendectomy). It was observed that in adults, laparoscopic appendectomy has less postoperative complications like wound infections, they stay for shorter time in hospital in postoperative time and return early to their routine activities, no intra-abdominal abscesses were formed and no re-exploration was done in these patients but total operative time of laparoscopic appendectomy was more in comparison to the open appendectomy. On the other hand, in children, there was no significant difference between two procedures in terms of postoperative pain control, wound infection, early discharge from hospital and early recovery[13].

Among all the parameters which are used to compare the laparoscopic and open appendectomies, duration of operative procedure is discussed a lot. In our study all laparoscopic appendectomies were performed by a consultant surgeon who was much experienced in laparoscopic procedures, even then it was observed that time of operative procedure of laparoscopic appendectomy is always longer than the open appendectomy and this fact is explained by the involvement of some extra steps in laparoscopic procedure like gas insufflation to create pneumoperitoneum, trocar insertion and then diagnostic laparoscopy.

Another meta-analysis which included 5 studies was done by Trejo-Avila. In this analysis total number of patients which were operated by laparoscopic procedure for acute appendicitis was 7079 and open appendectomy was performed of 6370 patients. In this meta-analysis 4 studies which were included, were observational studies, of which 2 were prospective and 2 were retrospective and one was a randomised controlled trial. The results of this meta-analysis favoured laparoscopic appendectomy in terms of short duration of hospital stay (mean difference = − 15.63 h, 95% CI = − 21.78 to − 9.49, P = < 0.00001) and less postoperative morbidity[14].

CONCLUSION

This study concluded that the outcome of laparoscopic appendectomy is better as compared to open appendectomy in patients presenting with appendicitis. So, we recommend that every surgeon should prefer the laparoscopic appendectomy when there is no contraindication because of its quick recovery and less morbidity.

Conflict of interest: Nil

REFERENCES

1. Bachur RG, Lipsett SC, Monuteaux MC. Outcomes of non-operative management of uncomplicated appendicitis. Pediatrics. 2017;140(1):e20170048
2. Di Saverio S, Birindelli A, Kelly MD, Catena F, Weber DG, Sartelli M, et al. WSES Jerusalem guidelines for diagnosis and treatment of acute appendicitis. World J Emergency surgery 2016;11(1):34.
3. Repplinger MD, Pickhardt PJ, Robbins JB, Kitchin DR, Ziemlewicz TJ, Hetzel SJ, Golden SK, Harringa JB, Reeder SB. Prospective comparison of the diagnostic accuracy of MR imaging versus CT for acute appendicitis. Radiology. 2018;288(2):467-75.
4. Pattanshetti VM, Krishna KL. Conventional laparoscopic appendectomy versus double-incision, three-port laparoscopic appendectomy: A 1-year randomized controlled trial. Asian JEndoscopic Surgery. 2018;11(4):366-72.
5. Sohn M, Agha A, Bremer S, Lehmann KS, Bormann M, Hochrein A. Surgical management of acute appendicitis in adults: A review of current techniques. Int. J Surgery. 2017;1;48:232-9.
6. Biondi A, Di Stefano C, Ferrara F, Bellia A, Vacante M, Piazza L. Laparoscopic versus open appendectomy: a retrospective cohort study assessing outcomes and cost-effectiveness. World J Emergency Surgery 2016;11(1):44.
7. Islam SR, Pasha K, Rahman S, Nasir E, Hanif E, Barman A. Laparoscopic vs open appendectomy: a comparative study. Bangladesh JEndosurgery2014;2(1):5-8.
8. Jaschinski T, Mosch C, Eikermann M, Neugebauer EA. Laparoscopic versus open appendectomy in patients with suspected appendicitis: a systematic review of meta-analyses of randomised controlled trials. BMC Gastroenterol. 2015;1:15(1):48.
9. Panin AV, Dubrovsky AV, Petrov DY, Smirnov AV. The results of open and laparoscopic appendectomy in pregnant women with acute appendicitis. Khirurgiia. 2016;1(4):21-5.
10. Jawad Khalil, RoohulMuqim, Mohammad Rafique, Mansoor Khan. Laparoscopic Versus Open Appendectomy: A Comparison of Primary Outcome Measures. Saudi J Gastroenterol. 2011;17(4):236–240.
11. Frazee RC, Roberts JW, Symmonds RE, Synder SK, Hendricks JC, Smith RW, et al. A prospective randomized trial comparing open versus laparoscopic appendectomy. Ann Surg 1994;219:725-8.
12. Bothara VP, Takrouney MH, Jadhav B, Osman MA, Ibrahim IA, Eltayeb AA, Sandlas G. Comparison of single incision with conventional laparoscopic appendectomy: a retrospective analysis between similarly matched cohort with review of literature. J Pediatric Endoscopic Surgery. 2020;11:1-6.
13. Dai L, Shuai J. Laparoscopic versus open appendectomy in adults and children: a meta-analysis of randomized controlled trials. United EuropGastroenterol J 2017;5(4):542-53.
14. Trejo-Avila M, Cárdenas-Lailson E, Valenzuela-Salazar C, Herrera-Esquivel J, Moreno-Portillo M. Ambulatory versus conventional laparoscopic appendectomy: a systematic review and meta-analysis. Int.J Colorectal Disease. 2019;5:1-0.